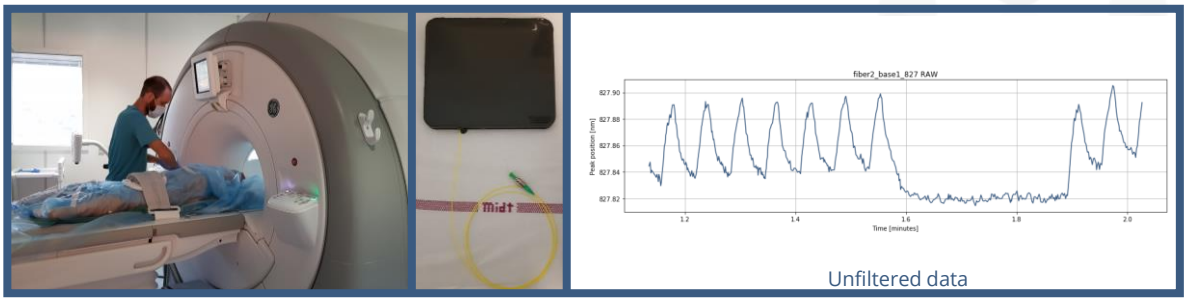
SHUTE Sensing Solutions A/S has developed a monitoring system based on a novel single-mode optical fiber, called a micro-structured Polymer Optical Fiber (mPOF). In order to make the sensing points, a Fiber Bragg Grating (FBG) is inscribed into the mPOF at pre-determined positions. The mPOF sensor is capable of measuring **s**train/stress, **hu**midity and **te**mperature. Made of polymer, it is light weight, hair thin, noncorrosive, nonelectrical conducting, flexible and durable.

Sensing in high magnetic fields

In cooperation with The MR Research Centre, Aarhus University, SHUTE tested its mPOF sensors inside a 3.0 Tesla GE Discovery MI scanner. We wanted to test for respiration, motion detection, pulse, and heart rate. The tests were performed on a 45 kilo, 3 months old, sedated pig inside a highly magnetic environment.

Test purpose 1

To monitor respiration/movement of a sedated pig by placing the pig on the back on top of a SHUTE sensor fiber patch (middle image).



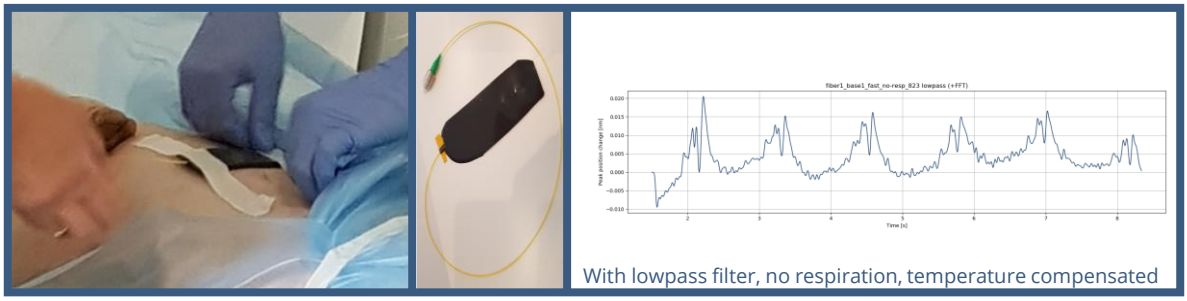
Unfiltered data

Result 1

The SHUTE fiber sensor bed patch easily detected respiration, see above graph. Note the flat part is when the medical staff paused the assisted respiration of the sedated pig. The sensor bed patch even picked up a detailed pulse graph when the data was filtered.

Test purpose 2

To monitor the pulse/heart rate of a sedated pig by placing a SHUTE sensor fiber patch on the chest (middle image).



With lowpass filter, no respiration, temperature compensated

Result 2

The sensitivity of the SHUTE sensor shows on the above graph. The pulse/heart movement is clear.

The operating radiologist tried to detect the SHUTE fiber; but conclusion was, that the fiber image did not disturb any tests and found the fiber virtually invisible.

To sum up, all the tested SHUTE sensors performed perfectly in the high magnetic field.

For more information visit www.shute.dk or feel free to call us on +45 2338 6728 to discuss how SHUTE technology can assist You in optimizing Your sensing requirements.